

PROBIOTICS

CELLULAR FRACTION-LINE

Technology Sustaining Probiotic Products

Fermentation represents an ancient form of cellular energy production. In ancient organisms present on earth before oxygen became highly concentrated in the atmosphere, fermentation was their primary means of biological energy production. In biochemistry, fermentation is an enzymecatalyzed, energy-producing process in which organic compounds provide and receive electrons . It is this metabolic pathway by which fuel molecules (such as sugar) are broken down to create energy in the absence of oxygen



In the process of glycolysis (an important type of fermentation) six-carbon sugar glucose is oxidized to two molecules of pyruvic acid yielding a small net gain of chemical energy (two ATP molecules per one molecule of glucose) to provide power to your cells.

This is truly the transformation of matter to energy - a real source of life-sustaining energy. In ethanol fermentation, yeast and bacteria break down the pyruvate into ethanol and carbon dioxide.

This is the process used to create alcoholic beverages. Lactic acid fermentation occurs when specific bacteria and fungi break down the pyruvate into lactic acid.

This process is used to produce yogurt, cheese, and a wide assortment of probiotic products.

ALIVE:

The key to the effectiveness of probiotics is that they must be delivered alive. This presents a challenge in terms of storage, delivery, and viability. The most common solution is refrigeration.

Refrigeration increases the shelf life of probiotic bacteria. From the moment probiotics are manufactured the bacteria start to die.

Both heat and moisture expedite the process of degrading. Heat kills the bacteria and moisture activates the natural process of degradation.

Our goal is to provide shelf stability at ambient room temperature.



CONVENTIONAL FREEZE DRYING:

This holds some promise but is deficient in certain aspects.

a. **Moisture level:** conventional freeze drying produces a result of approximately 5-6% moisture content. This is far too high. By the time the product reaches the consumer it has lost viability.

b. **Exposure to heat:** It is a trade secret that in most cases freeze drying results in a moisture content in the area of 10% before the heat is increased in the very last phase of the process to remove the “residual moisture.”

c. **Mechanical grinding:** After the product is dried it must be mechanically ground to a fine powder and in this grinding process it is easy to reach temperatures which damage the product. The mechanical grinding also hemorrhages cellular integrity and the extracellular matrix and is extremely damaging to live bacteria.

CELLULAR FRACTION-LINE TECHNOLOGY :

a. Moisture level:

Due to the greatly increased surface area exposed to sublimation the product comes from the machine with often less than 0.5% moisture content. If the product is not hygroscopic it may gain only a minor increase in moisture during its processing sequence. This allows the product to be delivered without having been exposed to moisture.

b. Exposure to heat:

The product flying around in a vortex dries with no exposure to heat at any time in the process. The exposed surface area increases the rate of heat exchange allowing the product to dry with no exposure to heat

CELLULAR FRACTION-LINE TECHNOLOGY :

c. Fractionalization:

The movement of the super frozen particles and sublimation of the ice structure that holds the particles together results in the product breaking down along natural cellular fraction lines thereby preserving the cellular structure and extracellular matrix. The product maintains its bioactivity. We avoid damaging the delicate cell structure of the probiotic organisms.

d. Easily absorbed:

The porous particle structure provides more surface area per unit of weight and is therefore more easily absorbed, digested, and metabolized.

Cellular Fraction-Line Technology is the best method known to sustain the vitality of the bacteria in a stable form. Once ingested the porous particle structure allows the probiotic bacteria to re-hydrate faster and more fully. A larger proportion of the bacteria will hydrate to become functional and begin to divide again as they did before being processed.

Cellular Fraction-Line Technology allows for multiple species and strains of bacteria to be combined in a single product without fear of competition.

Our process cannot increase the quality of the raw material you deliver to us. What we can do is deliver a stable dry powder that reflects the vitality of the probiotic bacteria at a level higher than any other process we have found.

Economic Considerations :

Fermented liquid products generally contain about 95% water. You are storing, shipping, and selling water. The costs involved in this are excessive and recent restrictions on shipping or carrying liquid products make this matter still more difficult. The water content will allow fermented products to continue to ferment resulting in an unstable product. The water provides the medium for probiotic bacteria to degrade.

Taste:

Many fermented products don't have a pleasant taste. This is a huge concern in regards to market acceptance and compliance. The freeze dried capsules effectively eliminate this consideration